UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte KOUTA FUKUI

Appeal 2007-0218
Application 10/730,143
Technology Center 1700

ON BRIEF

Before SCHEINER, ADAMS, and GRIMES, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a photothermographic material. The Examiner has rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

BACKGROUND

The specification describes "a photothermographic material comprising a photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent, and a binder on at least one surface of a support" (Specification 5). The specification states that the photosensitive silver

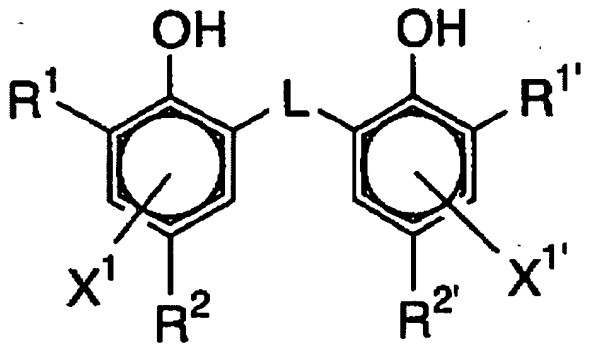
halide contains silver iodide "in an amount of 40 % to 100 % by mole" (*id.*), that "the reducing agent contains a compound represented by . . . formula (R-1)" (*id.* at 5-6), and that the "reducing agent may further contain a compound represented by formula (R-2) or (R-3)" (*id.* at 13). Formulas (R-1), (R-2), and (R-3) each represent a 2,4-dialkyl substituted orthobisphenol (see Suzuki,[1] col. 15, ll. 35-55).

DISCUSSION

1. CLAIMS

Claims 1-5 and 8-10 are pending and on appeal. The claims subject to each rejection have not been argued separately and therefore stand or fall together. 37 C.F.R. § 41.37(c)(1)(vii). We will focus on claims 1 and 2, which are representative and read as follows:

1. A photothermographic material comprising a photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent, and a binder on at least one surface of a support, wherein silver iodide is contained in the photosensitive silver halide in an amount of 40 % to 100 % by mole, and the reducing agent contains a compound represented by the following formula (R-1):



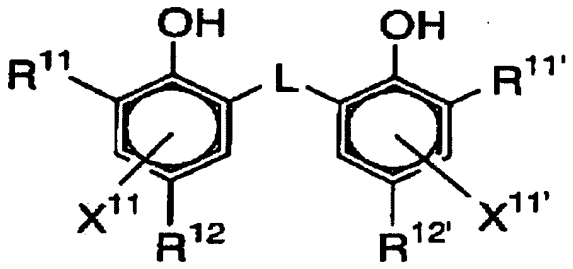
Formula (R-1)

[1] Suzuki et al., U.S. Patent No. 4,211,839, issued July 8, 1980.

wherein R^1 and $R^{1'}$ each independently represent an alkyl group having 3 to 20 carbon atoms, in which a carbon atom bonding to the benzene ring is secondary or tertiary; R^2 and $R^{2'}$ each represent a methyl group; L represents an -S- group or a -CHR^3- group, in which R3 represents a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; and X^1 and $X^{1'}$ each independently represent a hydrogen atom or a group capable of being substituted on the benzene ring; and

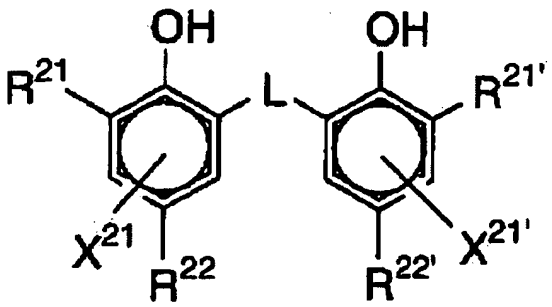
the reducing agent includes a second compound selected from formula (R-2) or from formula (R-3)

Formula (R-2)



wherein R^{11} and $R^{11'}$ each independently represent an alkyl group having 3 to 20 carbon atoms, in which a carbon atom bonding to the benzene ring is secondary or tertiary; R^{12} and $R^{12'}$ each independently represent an alkyl group having 2 to 20 carbon atoms; L represents an -S- group or a -CHR^{13}- group, in which R^{13} represents a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; and X^{11} and $X^{11'}$ each independently represent a hydrogen atom or a group capable of being substituted on the benzene ring;

Formula (R-3)



wherein R^{21} and $R^{21'}$ each independently represent a methyl group or an alkyl group having 2 to 20 carbon atoms, in which a carbon atom bonding to the benzene ring is primary; R^{22} and $R^{22'}$ each independently represent an alkyl group having 1 to 20 carbon atoms; L represents an -S- group or a $-CHR^{23}-$ group, in which R^{23} represents a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; and X^{21} and $X^{21'}$ each independently represent a hydrogen atom or a group capable of being substituted on the benzene ring.

2. The photothermographic material of claim 1, further comprising a compound represented by the following formula (H):

Formula (H)

$$Q\text{-}(Y)_n\text{-}C(Z_1)(Z_2)X$$

wherein Q represents an alkyl group, an aryl group, or a heterocyclic group; Y represents a divalent connecting group; n represents 0 or 1; Z_1 and Z_2 each represent a halogen atom; and X represents a hydrogen atom or an electron withdrawing group.

Thus, claim 1 is directed to a photothermographic material comprising a photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent, and a binder on a surface of a support. The photosensitive silver halide contains 40-100 mole % silver iodide and the reducing agent includes two compounds, a compound of formula (R-1) and a compound of either formula (R-2) or formula (R-3).

Claim 2 depends from claim 1 and recites that the photothermographic material also comprises a compound represented by formula (H).

2. OBVIOUSNESS REJECTION OF CLAIMS 1, 3-5, AND 8-10

Claims 1, 3-5, and 8-10 stand rejected under 35 U.S.C. § 103 as obvious in view of Toya 126,[2] Siga,[3] Matsumoto,[4] Suzuki, and Yoshioka.[5] The Examiner argues that Toya 126 discloses a photothermographic material containing a photosensitive silver halide (which can be all silver iodide or a mixture containing up to 40 mol % silver iodide), a non-photosensitive organic silver salt, a binder, and a reducing agent that can be a bisphenol. (Answer 3.)

The Examiner cites Siga for its disclosure that using at least 30 mole %, preferably at least 50 mole % silver iodide in the silver halide component provides a "dry image forming material excellent enough in both stability and sensitivity." (*Id.* at 3.)

The Examiner cites Suzuki for its teaching that using "two or more polyphenolic reducing agent[s] having alkyl group[s] at the two substitution position[s] adjacent to the hydroxyl-substituted position of the aromatic nucleus is effective for preventing discoloration upon exposure to light." (*Id.* at 4.) The Examiner also relies on Yoshioka for disclosing use of more than one phenol compounds as reducing agents and teaching that "ortho-phenol compounds are preferred because of their high heat-developability." (*Id.* at 7-8 (emphasis in original).) Finally, the Examiner argues that the Yoshioka's formula (1) encompasses "compounds of formula R-1, R-2 and

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[2] Toya et al., U.S. Patent No. 5,998,126, issued December 7, 1999.
[3] Siga et al., U.S. Patent No. 4,332,889, issued June 1, 1982.
[4] Matsumoto et al., U.S. Patent No. 5,958,668, issued September 28, 1999.
[5] Yoshioka et al., European Patent Application No. EP 1 096 310 A2, published May 2, 2001.

R-3" and that Yoshioka discloses specific compounds within formulas R-1, R-2, and R-3. (*Id.* at 8-9.) The Examiner concludes that the cited references would have made the product of claim 1 obvious to a person of ordinary skill in the art.

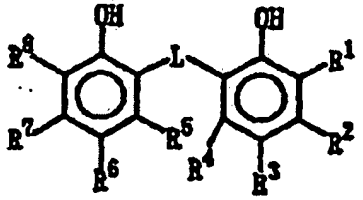
We conclude that the Examiner has set forth a prima facie case of obviousness. In particular, Toya 126 describes a photothermographic material comprising a photosensitive silver halide, an organic silver salt, a reducing agent for the organic silver salt, and a binder on a surface of a support (col. 1, ll. 38-40; col. 18, ll. 1-24; col. 21, ll. 41-47; col. 24, l. 61). Toya 126 states that the silver halide can be silver iodide or silver iodobromide (col. 16, ll. 50-53), thus teaching embodiments in which all or only a portion of the silver halide is silver iodide. In addition, Toya 126 teaches that silver iodobromide having a silver iodide content of 0.1 to 40 mole % is most preferred (col. 16, ll. 55-56). This preferred range overlaps the range recited in claim 1 at 40 mole %.

Siga describes an image forming material comprising a silver halide including silver iodide, an organic silver salt, a reducing agent, and a binder (col. 3, l. 60 to col. 4, l. 5). Siga states that this composition provides improved stability and sensitivity (col. 4, ll. 46-49). Siga also states that, "for the silver iodide to exert a sufficient effect," it is preferably included in an amount of at least 30 mole %, more preferably at least 50 mole %, based on the silver halide component (col. 6, ll. 43-50). Based on the teachings in Toya 126 and Siga, we agree with the Examiner that it would have been obvious to include, in the composition of Toya 126, silver iodide in an amount of at least 40 mole %, as recited in claim 1.

Claim 1 also requires that the product include a reducing agent comprising a compound represented by formula (R-1) and a compound represented by either formula (R-2) or (R-3). We agree with the Examiner that the cited references would have made this limitation obvious as well.

Toya 126 teaches that the exemplary reducing agents include bisphenols (col. 21, l. 55, to col. 22, l. 25). Suzuki also describes reducing agents for an organic silver salt in the presence of silver halide (col. 10, ll. 53-56), states that "reducing agents may be used as combinations of two or more" (col. 16, ll. 35-36), and states that the "most preferred reducing agents are 2,4-dialkyl substituted orthobisphenols, 2,6-dialkyl substituted parabisphenols or mixtures thereof" (col. 15, ll. 35-38). Suzuki states that reducing agents such as 2,4-dialkyl orthobisphenols are "effective for preventing discoloration upon exposure to light" (col. 16, ll. 53-58). Based on Suzuki, we agree with the Examiner that it would have been obvious to include two 2,4-dialkyl substituted orthobisphenols as reducing agents in the composition of Toya 126.

Yoshioka describes a photothermographic material comprising a photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent, and a binder, "wherein it contains one or more phenol compounds as the reducing agent" (¶ 0008). Yoshioka teaches that the phenol compound "is preferably an o-polyphenol compound, in particular, a compound represented by the following formula (I):



(¶ 0013), where R^1, R^3, R^6 and R^8 are "preferably a primary alkyl group having 1-20 carbon atoms, a secondary alkyl group having 3-20 carbon atoms, or a tertiary alkyl group having 4-20 carbon atoms" (¶ 0029). Yoshioka teaches that such compounds are "preferred because of their higher heat-developability" (¶ 0027).

Yoshioka discloses exemplary compounds within each of formulas (R-1), (R-2), and (R-3) of claim 1: compounds (I-3) and (I-4) on page 7 of Yoshioka are within formula (R-1), compound (I-12) on page 8 of Yoshioka is within formula (R-2), and compound (I-10) on page 7 of Yoshioka is within formula (R-3). Based on the teachings of Yoshikawa and Suzuki, we agree with the Examiner that a skilled artisan would have found it obvious to include two compounds within formula (I) of Yoshikawa, including a compound of formula (R-1) and a compound of either formula (R-2) or (R-3), as reducing agents in the composition of Toya 126.

Appellant argues that "none of the cited references teach or suggest the use of two different orthobisphenol reducing agents in combination." (Br. 12.) In particular, Appellant argues that Yoshioka "neither teaches nor suggests the use of bisphenols in any combination." (Br. 15 (emphasis omitted).)

In addition, Appellant states that "Suzuki refers to as a specific example the use of two reducing agents in mixture, namely 2,4-dialkyl substituted orthobisphenols and 2,6-dialkyl substituted parabisphenols," but argues that "this combination does not correspond to the combination recited in the present claim 1 . . . because Suzuki discloses a mixture of

orthobisphenol and parabisphenol while the present invention claims the combination of two orthobisphenols." (Br. 14, emphasis omitted.)

Appellant also argues that "there is no teaching or suggestion to combine the references to obtain the combination of a silver iodide-based photothermographic material with the specific combination of orthobisphenols of the present invention." (Br. 17.) Instead, Appellant argues that "the Examiner has used impermissible hindsight to 'pick and choose' individual components of the claimed invention from a wide variety of references in order to 'recreate' the claimed invention." (*Id.*)

We are not persuaded by these arguments. As discussed above, we agree with the Examiner that both Suzuki and Yoshioka suggest using two different orthobisphenol reducing agents in combination. Suzuki states that "reducing agents may be used as combinations of two or more thereof" (col. 16, ll. 35-36); that 2,4-dialkyl substituted orthobisphenols are among the "most preferred reducing agents" (col. 15, ll. 35-38); and that such compounds are "effective for preventing discoloration upon exposure to light" (col. 16, ll. 56-58).

Yoshioka describes a photothermographic material containing "one or more phenol compounds as the reducing agent" (¶ 0008) and states that o-polyphenol compounds of formula (I), which encompasses the orthobisphenol compounds of formulas (R-1), (R-2), and (R-3), are preferred because of their high heat-developability (¶ 0025 and ¶ 0027). Yoshioka also specifically discloses compounds within formulas (R-1), (R-2), and (R-3) of claim 1 (pp. 7-8). Based on the teachings in Suzuki and Yoshioka, we find that the Examiner has set forth a prima facie case that it would have

been obvious to include two different orthobisphenol reducing agents in combination, including a compound of formula (R-1) and a compound of either formula (R-2) or (R-3).

Therefore, we conclude that the Examiner has set forth sufficient motivation to combine the applied references to obtain the combination of a silver iodide-based photothermographic material with the specific combination of orthobisphenols recited in claim 1.

Appellant also argues that "these references do not refer to unexpected and superior results obtained by the use of the present invention, namely high sensitivity and excellent tone (pure black image)." (Br. 15.) In particular, Appellant argues that the "unexpected and superior results obtained by the use of specific orthobisphenol reducing agents in combination as recited in the present claim 1 are explicitly shown in the photographic performance data in Table 1 of the specification (page 229)," specifically in Experiments 5 and 6 as compared to Experiment 4 and in Experiments 8 and 9 as compared to Experiment 7. (Br. 15-16.)

We find Experiments 4-9[6] insufficient to rebut the Examiner's prima facie case that claim 1 would have been obvious. Experiments 5 and 6 contain orthobisphenols corresponding to Formulas (R-1) and (R-3), and Formulas (R-1) and (R-2), respectively. Experiment 4 contains only a

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[6] With regard to the comparison between Experiment 7 and Experiments 8 and 9, in addition to containing only one reducing agent, Experiment 7 differs from Experiments 8 and 9 in that the composition contains twice as much of the polyhalogen compounds (Specification 229). Thus, these experiments do not show that any difference in sensitivity was because of the reducing agents.

Formula (R-1) orthobisphenol. Experiments 5 and 6 are said to provide good balance in color tone and pure black tone whereas Experiment 4 is said to provide slightly bluish tone (Specification 227-229). However, Appellant has not presented any evidence that this difference would have been unexpected, particularly in view of the teaching in Suzuki that "the combined use of two mono- or poly-phenolic reducing agents having alkyl groups at the two substitution positions adjacent the hydroxy-substituted position of the aromatic nucleus is effective for preventing discoloration upon exposure to light" (col. 16, ll. 53-58). Thus, we are not persuaded by the attorney argument indicating that these results would have been unexpected. *In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984) ("It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.").

We conclude that the Examiner has set forth a prima facie case that claim 1 would have been obvious over Toya 126, Siga, Matsumoto, Suzuki, and Yoshioka, which Appellant has not rebutted. We therefore affirm the rejection of claim 1 under 35 U.S.C. § 103. Claims 3-5 and 8-10 fall with claim 1.

3. OBVIOUSNESS REJECTION OF CLAIM 2

Claim 2 stands rejected under 35 U.S.C. § 103 as obvious in view of Toya 126, Siga, Matsumoto, Suzuki, Yoshioka, and Toya 419.[7] The Examiner states that Toya 419, at column 2, lines 1-18, and column 12, compound (II-a), describes using a "polyhalogenate compound of

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[7] Toya et al., U.S. Patent No. 5,656,419, issued August 12, 1997.

formula (H) . . . to provide a photothermographic material with higher contrast." (Answer 4-5.) The Examiner argues that it "would have been obvious . . . to use the polyhalogen compound taught in Toya [419] in the material obtained by the combination of [Toya 126, Siga, Matsumoto, Suzuki, and Yoshioka] with a reasonable expectation of achieving a material with higher image contrast." (Answer 5.) We conclude that the Examiner has set forth a prima facie case that claim 2 would have been obvious.

Appellant merely argues that Toyo 419 "does not cure the deficiencies of the other references" and that therefore "[c]laim 2 should be deemed allowable by virtue of its dependency to claim 1." (Br. 17-18.) However, for the reasons discussed above, we conclude that claim 1 would have been obvious. Appellant has not rebutted the Examiner's prima facie case that claim 2 would have been obvious. We therefore affirm the rejection of claim 2 under 35 U.S.C. § 103.

SUMMARY

The Examiner's position is supported by the preponderance of the evidence of record. We therefore affirm the rejection of claims 1-5 and 8-10 under 35 U.S.C. § 103.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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